

**REMARKS**

Claims 1-13 are pending in the present application. For at least the reasons herein, Applicant respectfully requests withdrawal of the rejections, and allowance of the claims.

**I. Allowable subject matter**

The Examiner has indicated that claims 3, 6, 10 and 13 are allowable, and would be allowed if rewritten in independent form. Applicant thanks the Examiner for the indication of allowability. However, Applicant respectfully declines to rewrite the allowable claims in independent form at this point, pending further reconsideration of the rejected claims for at least the reasons provided below.

**II. The claims are novel**

Claims 1, 2, 4, 5, 7-9, 11 and 12 stand rejected under 35 U.S.C. § 102(b) over Nakamura et al. (U.S. Patent No. 5,321,478, hereafter "Nakamura"). Applicant respectfully submits that Nakamura fails to disclose all of the claimed combinations of features, as required for an anticipation rejection. For at least the reasons herein, Applicant respectfully requests withdrawal of the rejection, and allowance of the claims.

The presently claimed invention relates to an image forming device including a heating device and a control device. The control device alters a period (i.e., cycle period)<sup>1</sup> of on/off

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<sup>1</sup> With respect to the "cycle period," Applicant refers the Examiner to application page 11, lines 22-24, which discloses that the duty ratio of the control signal is shown as being fixed, but that the duty ratio is varied by PID control. Accordingly, it is submitted that a novel feature of the presently claimed  
...(footnote continued)

control based on the control mode. As a result, it is an object of the presently claimed invention to control the related art problem of flicker by suppressing flicker in an image forming device. Applicant notes that in the related art, the on-off control of the heater has resulted in flicker. Applicant also notes that there is a difference between the on/off period in the control mode, and time duration of the control mode. This distinction is discussed in greater detail herein.

One period in each control mode is a time period required for one on-off cycle. That is, one period is generally composed of a time in which electric power is supplied to the heater (a state in which an electric power supply is on) and another time in which electric power to the heater is cut off (a state in which the electric power supply is off). In each control mode, a plural number of on-off cycles with respective periods (i.e., T1 for the printing mode, T2 for the standby mode and T3 for the pre-heating mode, as illustrated in Figures 3A-3C) exist for a required time duration of the relevant control mode. Therefore, the period T1 is different from the duration of the printing mode (from start to completion of the printing mode).

In the claimed invention, T1 is less than T0.

Alternatively, a standby mode may be provided as a mode for keeping the heating drum in a state such that image formation can be initiated in a short time, and a pre-heating mode reduces power consumption while keeping the heating drum in such a state that image formation can be quickly initiated. In that case, the period of the standby mode is T2, the period of the pre-

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invention is directed to varying the on/off period (i.e., cycle period), rather than varying the duty ratio (i.e., the ratio of time when power is supplied relative to one cycle time in each control mode).

heating mode is T3, and the period of the printing mode is T1. In this embodiment, T1 is less than or equal to both T2 and T3, and at least one of T2 and T3 is greater than T1.

In application Figures 3A-3C, the period of on/off control is disclosed to be the cycle period of the control signal. Thus, throughout the time when the device is in any of the modes of operation, there will be a control signal that performs on/off control, which will have a cycle period as illustrated in application Figures 3A-3C.

Nakamura discloses an image forming apparatus having an image forming mode and a standby mode. Figure 16 of Nakamura illustrates change in surface temperature of the fixing roller in the image forming apparatus. Each of the times ts1, ts2, and ts3 is a duration of time during which a temperature of the fixing roller is in a standby mode, for times other than image formation. The printing mode has a time duration represented by the time between ts1 and ts2, or between ts2 and ts3. Nakamura discloses a warm-up mode (illustrated in Figure 16 as the interval between  $t=0$  and Tso) that allows prompt initiation of the image forming process.

However, Applicant respectfully submits that Nakamura does not disclose any cycle period for the control signal for on/off control. Figure 16 of Nakamura does not disclose any sort of period for a control signal for each of the disclosed modes, and only discloses flat horizontal lines indicative of a time duration, as opposed to any sort of cycle period. Further Applicant respectfully submits that a duration of time of a mode is distinguishable from a period of a control signal.

Applicant respectfully submits that Nakamura fails to disclose all of the claimed combinations of features. For example, but not by way of limitation, Applicant respectfully submits that Nakamura fails to disclose altering a period of on/off control in accordance with a printing mode for maintaining the heating drum at the predetermined temperature during image-formation, and an ordinary mode used at times other than during image-formation, wherein, a period of on/off control of the printing mode is less than a period of on/off control of the ordinary mode, as recited in independent claim 1.

Additionally, Applicant respectfully submits that Nakamura fails to disclose a period (i.e., cycle time or cycle period) of on/off control for controlling the heating device and altering a period of on/off control in accordance with a printing mode for maintaining the heating drum at the predetermined temperature during image-formation, a standby mode for keeping the heating drum in a state such that image-formation can be initiated promptly, and a pre-heating mode for reducing power consumption of the heating drum while keeping the heating drum in a state such that image-formation can be initiated in a short time, wherein, if a period of on/off control of the printing mode is  $T_1$ , a period of on/off control of the standby mode is  $T_2$  and a period of on/off control of the pre-heating mode is  $T_3$ , then  $T_1 \leq T_2$ ,  $T_1 \leq T_3$ , and at least one of  $T_2$  and  $T_3$  is greater than  $T_1$ , as recited in independent claim 12.

Dependent claims 2, 4, 5, 7-9 and 11 depend from independent claim 1. Applicant respectfully submits that the dependent claims are allowable for at least the same reasons as discussed above with respect to independent claim 1, from which they depend.

Response Under 37 C.F.R. § 1.116  
U.S. Appln. No. 09/899,530

Accordingly, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 102, and allowance of the claims.

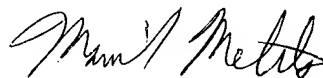
### III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880.

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Respectfully submitted,



Mainak H. Mehta  
Registration No. 46,924

SUGHRUE MION, PLLC  
Telephone: (202) 293-7060  
Facsimile: (202) 293-7860

WASHINGTON OFFICE



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